WHAT IS CLAIMED IS:

1. A method for compensating for attenuation in an input signal, comprising:

receiving an input signal;

communicating a first portion of the input signal on a first path;

communicating a second portion of the input signal on a second path;

communicating a third portion of the input signal on a third path;

applying a first gain to the first portion of the input signal;

applying a first-order mathematical operation and a second gain to the second portion of the input signal;

applying a second-order mathematical operation and a third gain to the portion of the input signal; and

recombining the first portion, the second portion, and the third portion into an output signal.

2. The method of Claim 1, further comprising:

monitoring the output signal to detect a variation in an output characteristic of the output signal; and

in response to detecting the variation, adjusting the gain applied to at least one of the portions of the input signal.

3. The method of Claim 2, wherein:

the step of monitoring comprises monitoring inter-symbol-interference in the output signal; and

the step of adjusting the gain comprises determining an adjustment for the gain applied to each portion of the signal based on the inter-symbol-interference.

4. The method of Claim 1, further comprising:

measuring transmission properties for a communication medium; and

setting the first gain, the second gain, and the third gain based on the measurements of the first communication medium.

5. The method of Claim 4, wherein:

the communication medium is a first communication medium; and

the method further comprises:

measuring transmission properties for a second communication medium; and

setting the first gain, the second gain, and the third gain based on the measurements of the second communication medium.

6. The method of Claim 1, further comprising:

determining a target ratio between the second gain and the first gain such that the second gain provides a predetermined relative gain as compared to the first gain; and

adjusting the first gain until the ratio between the second gain and the first gain reaches the target ratio.

7. The method of Claim 1, further comprising conditioning the input signal using a variable gain limiting amplifier.

8. The method of Claim 1, wherein:

the gain is applied to each portion of the signal by a respective amplifier, wherein the gain of each of the amplifiers is controlled by a bias current applied to the amplifier; and

the method further comprises adjusting the bias current applied to one or more of the amplifiers.

9. The method of Claim 1, further comprising:

amplifying the output signal; and

communicating the output signal to a next destination.

10. The method of Claim 1, further comprising introducing a delay in communication of at least one of the portions of the input signal down the respective path.

11. The method of Claim 1, wherein:

the first-order mathematical operation comprises taking a derivative; and

the second-order mathematical operation comprises taking a second derivative.

12. The method of Claim 1, wherein:

the first gain is applied by a first multi-stage amplifier;

the second gain is applied by a second multi-stage amplifier;

the third gain is applied by a third multi-stage amplifiers; and

the method further comprises applying a correction voltage to a plurality of stages in each multi-stage amplifier to correct a DC offset imparted by the respective multi-stage amplifier.

13. An apparatus for compensating for attenuation in an input signal, comprising:

an input operable to receive an input signal;

a plurality of signal paths, comprising:

a first path operable to receive a first portion of the input signal;

a second path operable to receive a second portion of the input signal; and

a third path operable to receive a third portion of the input signal;

a first amplifier operable to apply a first gain to the first portion of the input signal;

a second amplifier operable to apply a second gain to the second portion of the input signal;

a third amplifier operable to apply a third gain to the third portion of the input signal;

a first mathematical operator operable to apply a first-order mathematical operation to the second portion of the signal;

a second mathematical operator operable to apply a second-order mathematical operation to the third portion of the signal; and

a mixer operable to recombine the first, second, and third portions into an output signal.

14. The apparatus of Claim 13, further comprising:

an output monitor operable to monitor the output signal for a variation in an output characteristic; and

an adaptive controller operable to adjust at least one of the gains in response to detecting the variation in the output characteristic of the output signal.

15. The apparatus of Claim 14, wherein:

the output monitor monitors for inter-symbol interference in the output signal; and

the adaptive controller is further operable to determine which of the gains to adjust based on the inter-symbol-interference detected by the output monitor.

16. The apparatus of Claim 14, wherein:

each of the amplifiers is controlled by a bias current applied to the respective amplifier; and

the adaptive controller is further operable to adjust the bias currents applied to the amplifiers.

17. The apparatus of Claim 14, wherein the adaptive controller is further operable to:

determine a target ratio between the second gain and the first gain such that the second gain provides a predetermined relative gain as compared to the first gain; and

adjust the first gain until the ratio between the second gain and the first gain reaches the target ratio.

18. The apparatus of Claim 13, wherein the input comprises a variable gain limiting amplifier operable to condition the input signal.

19. The apparatus of Claim 13, further comprising a drive amplifier operable to:

amplify the output signal; and

communicate the output signal to a next destination.

20. The apparatus of Claim 13, wherein the:

the first-order mathematical operation comprises taking a derivative; and

the second-order mathematical operation comprises taking a second derivative.

21. The apparatus of Claim 13, wherein:

the first amplifier, the second amplifier, and the third amplifier are all multi-stage amplifiers; and

the apparatus further comprises an offset controller operable to apply a correction voltage to a plurality of stages in each of the amplifiers to correct a DC offset imparted by the respective amplifier

22. An apparatus for compensating for attenuation in an input signal comprising:

a variable gain limiting amplifier operable to receive and condition an input signal and further operable to communicate a first portion, a second portion, and a third portion of the input signal using a first, second, and third signal path, respectively;

a first amplifier operable to apply a first gain to the first portion of the input signal;

a second amplifier operable to apply a second gain to the second portion of the input signal;

a third amplifier operable to apply a third gain to the third portion of the input signal;

a first mathematical operator operable to take a derivative of the second portion;

a second mathematical operator operable to take a second derivative of the third portion;

a mixer operable to recombine the first, second, and third portions into an output signal;

an output monitor operable to monitor inter-symbol-interference in the output signal;

an adaptive controller coupled to the output monitor operable to adjust one or more of the gains in response to the inter-symbol-interference detected by the output monitor, wherein the adaptive controller controls each of the gains by adjusting a bias current applied to the respective amplifier; and

a drive amplifier operable to amplify the output signal and to communicate the output signal to a next destination.